FRICTION CHARACTERISTICS OF BAND SAW BLADE STRAIN GUIDE

Vlado Goglia – Igor Đukić

Abstract

The band saw strain guide effectivenessis still avery interesting problem since it is influenced by many parameters. Strain guides increase machine's own resistance. Due to the pressure between strain guides and band saw blade the friction forces cause a loss of energy, heat the band saw blade and reduce its stability. The friction characteristics of strain guides material are from that reason very important. The paper presents the results of testing the friction characteristics of the two most frequently used strain guides materials. Stick/sleep effect as well as friction force during movement of dry and lubricated surface were tested.

Key words: *band saw, band strain guides, friction characteristics*

INTRODUCTION

The strain guides are designed in the same way as the conventional ones. The bottom guide is fixed. The top guide is ussualy adjustable. Through the guides the compressed air is flowing between the guides and the saw blade. the compressed air pressure is adjustable.
The strain guides are made of material with a low coefficient of friction. The pressure guides provide increased stability Willistone (1980) but they also cause stress in the outer fibre of the blade and do not influence the risk of the conventional gullet cracks decisively. Willistone (1978) suggests that the best guiding effect is obtained when the blade is kept out about 10 mm from the vertical line between the wheel rim. *Udeholm* recomends the optimal guides position with a setting of 0,4 to 0,5 in (10-12,5 mm)(1990). The band saw producer suggests that the optimal guides position is 5 mm, but they may be placed at range from 3 to 8 mm from the vertical line between the whell rim. The positio can be easily adjusted as it is shown in Figure 1. Through the guides the compressed air is brought between the guides and the saw blade. On the machine, on which the the tested strain guides material were used the air pressure can be adjusted between 0 and 3,8 bars. The compress air exercizes forces on the saw blade. The amount of force depends on size of the slots surface on the front side of the guides and the compressed air pressure. The guides must be controlled and replaced regulary.

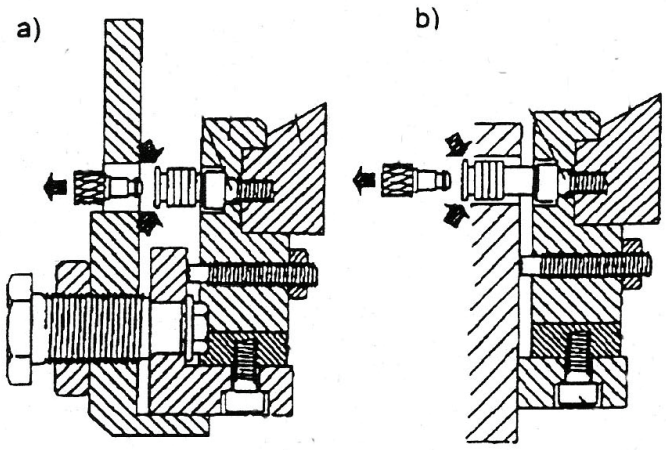

Figure 1. Strain guides: a) upper guide and b) lower guide

MATERIAL AND METHODS

Friction characteristics of the two most frequently used strain guides material were tested. The testing procedure was carried out as it is shown on Figure 2. Stick-sleep effect as well as friction force during movement on dry and lubricated surface were tested. Measurements were carried out of 600 Hz sampling frequency. Measurements were carried out with *Data Acquition System* ***DMC 9021A*** *– Hottinger HBM.* The deplacement was measured using unductive tranducer and the forces were measured using the dynamometer from the same producer.

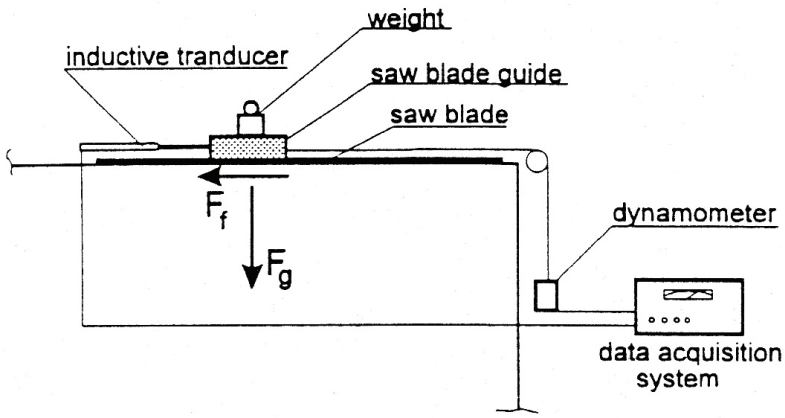

Figure 2. Friction characteristics testing procedure

RESULTS

As it was mentioned before, two most frequently used strain guides materials were tested: ***Novilon*** and ***Novilon Oilon***. Four measurement were repeated for both materials with dry and with lubricated surfaces. Two examples of measuring results are graphically represented if Figures 3 and 4. The measuring results are given in Tables 1 and 2. As expected, material type ***Novilon Oilon*** has shown better friction characteristics by ca. 12,5 %.

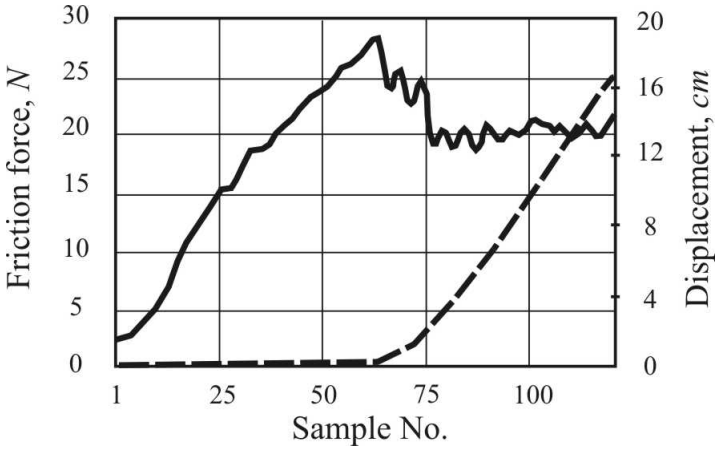

Figure 3. Example of the friction force measuring results on dry surface

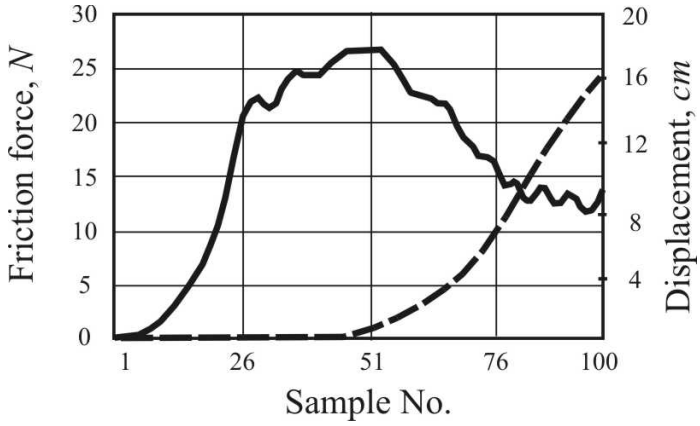

Figure 4. Example of the friction force measuring results on lubricated surface

Table 1. Maximum friction force measuring results (Stick-sleep effect)

Meas No.	Novilon		Novilon Oilon	
	Dry	Lubric.	Dry	Lubric.
1	28.4	24.9	30.0	27.9
2	32.4	27.5	34.5	28.0
3	32.3	25.6	38.4	26.4
4	29.8	27.0	33.4	29.8
Mean	**30.7**	**26.3**	**34.1**	**28.0**
Fric. coef.	**0.36**	**0.31**	**0.4**	**0.33**

Table 2. Friction force measuring during movement

Meas No.	Novilon		Novilon Oilon	
	Dry	Lubric.	Dry	Lubric.
1	21.9	13.0	16.4	10.3
2	19.6	13.7	18.9	14.6
3	21.1	14.0	17.4	10.8
4	19.6	12.7	18.6	13.3
Mean	**20.6**	**13.4**	**17.7**	**12.3**
Fric. coef.	**0.24**	**0.16**	**0.21**	**0.14**

CONCLUSION

Friction characterisitcs measurements has shown relatively high coefficient of friction for tested materials. The consequences are: high level of power consumption on the guides and high saw blade temperature. This may affect the accuracy of the cutting process. The high saw blade temperature due to the high coefficient of friction of the strain guide materials was later confirmed by measurement on the log band saw at idling. The saw blade temperature measurements have shown significantly higer temperature as compared to the conventional guides.

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